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| 09/335,618      | 06/18/1999  | JOSEPH M. BRAND      | MIO-051-PA          | 6676             |

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EXAMINER

CHAMBLISS, ALONZO

|          |              |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
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2827

DATE MAILED: 06/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/335,618

Applicant(s)

BRAND, JOSEPH M.

Examiner

Alonzo Chambliss

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 2/4/02(amendment E).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,4-13,23 and 32-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,4-13,23 and 32-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 17.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

1. Amendment E filed on 2/4/02 has been fully considered and made of record as Paper No. 18.

***Response to Arguments***

2. Applicant's arguments with respect to claims 1, 4-13, 23, and 32-34 have been considered but are moot in view of the new ground(s) of rejection.

***Information Disclosure Statement***

3. The information disclosure statement submitted on 1/4/02 in Paper No. 17 was filed after the mailing date of the non-final rejection on 12/14/01 in Paper No. 16. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the petition is granted and the information disclosure statement is being considered by the examiner.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 4-13, 23, and 32-34 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time

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the application was filed, had possession of the claimed invention. Claims 1, 7, 8, 13, 23, and 32-34 all recite the negative limitation **consisting essentially of**. The negative limitations does not appear in the specification as filed, since the specification on pages 3-7 all state that the packaged semiconductor device **is provided comprising** the essential elements of applicant's claimed invention. The negative limitation **consisting essentially of** means that additional elements (i.e. structure) cannot be added to the device. Therefore, claims 1, 4-13, 23 and 32-34 are rejected under 112 first paragraph.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1, 4-13, 23 and 32-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. In claims 1, 7, 8, 13, 23, and 32-34, the phrase "consisting essentially of" is vague and indefinite since the specification on pages 3-7 all state that the packaged semiconductor device is provided comprising the essential elements of applicant's claimed invention. The negative limitation **consisting essentially of** means that additional elements (i.e. structure) cannot be added to the device. However, claims 7, 33, and 34 recite the phrase **consisting essentially of** but adds a solder resist layer to structure of claims 1, 8, 13, and 32 that recite **consisting essentially of**. Therefore, claims 1, 4-13, 23 and 32-34 are vague and indefinite.

***Claim Rejections - 35 USC § 103***

8. Claim 1, 4-6, 8-12, 23, and 32, insofar as being definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hegel (U.S. 5,255,157) in view of Golubic et al. (U.S. 5,473,192).

With respect to Claims 1, 4, 8-10, 23, and 32, Hegel discloses a chip 13 and a laminate defining first and second major faces. The laminate 10 has an electrically conductive layer, an underlying substrate supporting the electrically conductive layer, and at least one void 21 in the laminate 10 so as to extend from the first major face through the electrically conductive layer. The void 21 goes through the underlying substrate and through the second major face. An encapsulant 16 is positioned to mechanically couple the semiconductor die 13 to the first major surface of the laminate 10, wherein the encapsulant is further positioned to extend through the void 21 from the first major face to the second major face and contacting the underlying substrate. The plastic encapsulant 16 locks to the substrate thereby creating an adhesive bond (see col. 2 lines 13-38 and 59-69 and col. 4 lines 18-26; Fig. 4). Hegel does not disclose not having an adhesive between the die and the laminate to have a device consisting essentially of a die, laminate, and an encapsulant. However, with respect to Claims 1, 4, 8-10, 23, and 32, Golubic discloses a chip bonded to a substrate without the use of an epoxy or a metallic layer (i.e. die attachment adhesive), since the epoxy or metallic layer would cause die cracking or improper bonding between the chip and the substrate because the epoxy or metallic layer has a different thermal coefficient of expansion than the chip or the substrate (see col. 1 lines 25-44, col. 2 lines 55-62, and col. 4 lines 58-

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68). Therefore, it would have been obvious to not to incorporate a die attachment adhesive with Hegel, since the epoxy or metallic layer would cause die cracking or improper bonding between the chip and the substrate because the epoxy or metallic layer has a different thermal coefficient of expansion than the chip or the substrate as taught by Golubic.

With respect to Claims 5 and 11, Hegel discloses an encapsulant 16' occupies substantially the entire void 21 (see Fig. 4).

With respect to Claims 6 and 12, Hegel discloses a chip 13 is supported by the laminate and wherein the encapsulant 16, 16' and the laminate 10 are arranged to enclose substantially the entire chip 13 (see Fig. 4).

9. Claims 7, 33, and 34, insofar as being definite, are rejected under 35 U.S.C. 103(a) as being unpatentable over Hegel (U.S. 5,255,157) and Golubic et al. (U.S. 5,473,192) as applied to claim 1 above, and further in view of Juskey et al. (U.S. 5,336,931).

Hegel-Golubic both fail to disclose a solder mask as part of the laminate, wherein the conductive layer is between the solder mask and the substrate with a void extending through the solder mask. However, with respect to Claims 7, 33, and 34, Juskey discloses a solder mask as part of the laminate, wherein the conductive layer is between the solder mask and the substrate 160. the void 150 extends through the solder mask (see col. 4 lines 54-68 and col. 5 lines 1-4; Figs. 2 and 3). Therefore, it would have been obvious to incorporate the solder mask with Hegel-Golubic, since the solder mask would facilitate the formation of metal patterns on the laminate that are

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used as connection areas for bonding wires extending from the chip as taught by Juskey.

10. Claim 13, insofar as being definite, is rejected under 35 U.S.C. 103(a) as being unpatentable over Hegel (U.S. 5,255,157) and Golubic et al. (U.S. 5,473,192) as applied to claim 1 above, and further in view of Papathomas (U.S. 5,623,006).

Hegel-Golubic both fail to disclose a laminate made of FR-4 epoxy glass.

However, with respect to Claim 23, Papathomas discloses a laminate made of FR-4 epoxy glass (see col. 8 lines 35-45). Therefore, it would have been obvious to substitute the FR-4 epoxy glass for the laminate taught by Hegel-Golubic, since the FR-4 epoxy glass is a conventional and preferred material for substrates or printed circuit boards because of their high temperature characteristics as taught by Papathomas.

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

### ***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.



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AC/June 4, 2002